DCS: A-10C „Tank Killer"
Scorpion
Helmet Monted Cueing System

Version 1.2

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Contents

Improved Situational Awareness

The Scorpion® Helmet Mounted Cueing System (HMCS) is a lightweight, precision weapon and sensor cueing system that can be easily integrated into pilot's helmets. The system provides the ability to place a sensor in the pilot's line of sight and create situational awareness via a Helmet Mounted Display (HMD).

Through the interaction with existing sensors of the A-10C and fully integration with the aircraft avionics, a three-dimensional representation of received and transmitted DATALINK signals is created, which enables an exact image of the acting units on the battlefield.

Data is simultaneously delivered to aircrew and ground command and control enabling immediate, intuitive interpretation. Heightened situational awareness enhances operational efficiency enabling precise designation for accurate, rapid, real-time threat elimination maintaining crew safety.

The symbols for active and inactive waypoints, positions of allied ground and air forces, as well as other distinctive marks are permanently displayed to the pilot via a monocular in his field of vision.

The HMCS is designed so that it can be easily combined with night vision devices. Both systems can be used simultaneously.

With Scorpion® HMCS the A-10C pilot will successfully identify, designate and eliminate adversarial threats.

This manual is intended to be a quick introduction and operating information to the Scorpion HMCS for the DCS: A-10C.
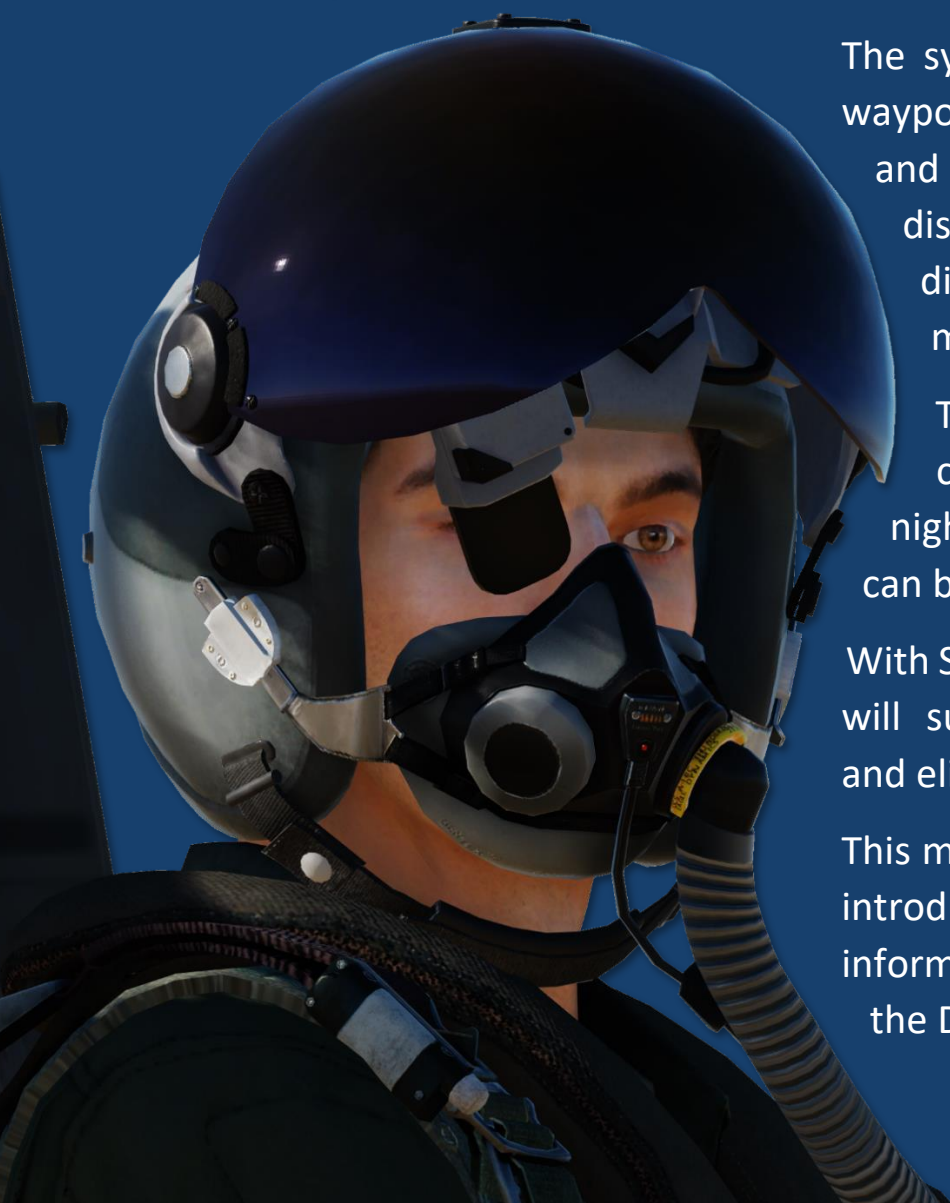
Control elements of the Interface Control Unit (ICU)

HVI UNSAFE

REPLACE BATTERY

+

ON
OFF
BAT

ICU Power Switch
(3-Position Switch)

Control elements of the Stick

Display Management Switch (DMS)
(4-Position Switch)

Target Management Switch (TMS)
(4-Position Switch)

Control elements of the Throttle

Coolie Hat
(4-Position Switch)

Slew / Track Control
(2-Axis Controller & Pushbutton)

China Hat
(Rocker Switch)

Controls Overview
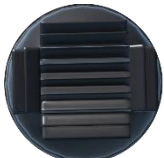
Interface Control Unit (ICU)

	↖	**ON.** Power to the HMCS through the aircraft electrical power supply system.
	↔	**OFF**. Power removed from the HMCS.
	↘	**BAT**. Power to the HMCS using a battery stored in the panel. This allows it to be tested without need of aircraft electrical power.

Display Management Switch (DMS)

	↑	Increase HMD Brightness.
	⇧	Increase HMD Brightness.
	↓	Decrease HMD Brightness.
	⇩	Decrease HMD Brightness.
	←	Display Right MFCD TGP Video.
	⇐	HMD On/Off.
	→	Cycle HMCS Profiles.
	⇒	Slave TGP to HMCS Line of Sight.

Target Management Switch (TMS)

	↑	Hook Symbol Under Crosshair.
	⇧	Make Hooked Object or HDC SPI.
	↓	Unhook Symbol.
	⇩	Reset SPI to Steerpoint.
	←	Acknowledge WCN (Warning, Caution and Notes).
	⇐	Broadcast SPI.
	→	Create Mark Point at HDC.
	⇒	Make Last Mark Point SPI.

Coolie Hat

	↑	Toggles HUD / HMCS SOI.
	↓	Swap Left MFCD and Right MFCD.
	←	Cycle Left MFCD Page.
	⇐	Left MFCS as SOI.
	→	Cycle Right MFCD Page.
	⇒	Right MFCD as SOI.

Slew / Track Control

	↻	Slews the HDC to any location within the HMD FOV.
	↧	HDC ground stabilization.

China Hat

	↖	TGP FOV change / LSS FOV change.
	↙	Slave All to SPI.
	↘	Reset / Cage HDC to Crosshair.
	↶	Slave TGP to SPI.

HMCS Symbology Overview

The screenshot on the page after next shows all 25 symbols that can be displayed by the Scorpion® HMCS. The explanations of the symbols are shown on this page and on the next page.

①	**Horizon Line.** The HMD displays a solid Horizon Line to provide a horizon indicator. When the Horizon Line moves outside of a centered 18-degree wide FOV the Horizon Line will become the Ghost Horizon Line. The Ghost Horizon Line is dashed and will be clamped to the edge of the centered 18-degree wide FOV.
②	**HMD Heading.** The current magnetic heading of the HMD LOS.
③	**Steerpoint.** Steerpoints that are not current selected are indicated as green square and dot with the steerpoint in blue beneath.
④	**Current Mark Point.** The selected mark point is indicated as a green square and dot with the mark point name in blue beneath. The HDC is used to create a mark point. If TMS-RIGHT/SHORT is commanded while a valid HDC symbol is displayed on the HMD, a mark point will be created at that position.
⑤	**Hook Frame.** The hooked object is indicated by a green dashed frame. The yellow hook indicator ⑭ always points in the direction of this mark. The data block for the hooked object is displayed in the lower left corner of the HMD ⑰.
⑥	**Air PPLI.** Other, friendly, non-flight aircraft are indicated as green circles. The green number below the circle indicates the distance in NM.
⑦	**Flight Member SPI.** The SPI from another flight members aircraft is indicated as a two-level, blue wedding cake symbol with their flight position in green in the center.
⑧	**Flight Member PPLI.** Other flight members are displayed as blue circles with their flight position in green in the center. Note that the PPLI symbol will lag with the actual aircraft due to datalink transmission delays. The green number below the circle indicates the distance in NM.
⑨	**Current Steerpoint.** The current steerpoint is marked by a yellow square and dot with the steerpoint in blue beneath.
⑩	**Ground EPLRS.** Friendly ground units with EPLRS radios are indicated as a green "X" symbol.
⑪	**Airspeed.** Indicated Air Speed (IAS) of the aircraft.
⑫	**SPI Indicator.** The HMD provides a cue to the SPI when the SPI is located outside the HMD Field of View (FOV). The cue consists of a green line drawn from the center of the fixed crosshair to the edge of the display in the direction of the SPI. The line will grow as the SPI moves farther from the edge of the display.
⑬	**Crosshair.** Located at the center of the HMD display as crosshair symbol which provides the Line of Sight (LOS) cue.

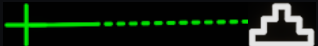|	
⑭	**Hook Indicator**. The HMD provides cue to the object that is hooked by the pilot and therefor indicated by the green dashed frame ⑤ when the hooked object is located outside the HMD Field of View (FOV). The cue consists of a yellow line drawn from the center of the fixed crosshair to the edge of the display in the direction of the hook frame. The line will grow as the object moves farther from the edge of the display.
⑮	**Donor SPI**. The SPI from friendly, donor aircraft are indicated as a two-level, green wedding cake symbol.
⑯	**Barometric Altitude**. Indicates the aircraft altitude based on atmospheric pressure.
⑰	**Data Block.** The data block shows the provided data for a hooked object. The displayed values vary depending on the object.
⑱	**SOI Indication**. To command HMCS HOTAS commands, the HMD must the Sensor of Interest (SOI). Coolie Switch up toggles the SOI between the HUD and HMD. When the HMD is SOI, it is indicated by an asterisk in the bottom/left corner of the HMD field of view.
⑲	**TGP FOV Indicator.** The green dashed frame with the diamond symbol in the center shows the TGP FOV. The framed area is the area displayed on the TGP page. If the TGP page is SOI, the field of view can be enlarged and reduced with DMS-FWD/SHORT/LONG and DMS-BKW/SHORT/LONG.
⑳	**TGP LOS cue.** The diamond symbol shows the line of sight of the targeting pod (TGP).
㉑	**Helmet Designation Cursor (HDC)**. The HMD utilizes a Helmet Designation Cue (maneuvered by the Slew/Track Control switch when HMD is the SOI). If the HDC position has not been previously determined, the HDC symbol is caged within the Crosshair. The Slew Control switch slews the HDC to any location within the HMD FOV. When the Slew Control Switch is pressed and released, the HDC attempts to establish a position on the ground (defined by a lat/long/elevation). If successful, the HDC becomes ground stabilized at that point. The HDC can then be made SPI either by hooking it and commanding TMS-FWD/LONG or by commanding a TMS-FWD/LONG when nothing is currently hooked. The HDC will stay Helmet stabilized until the Slew/Track Control Switch is bumped or moved onto a valid ground position at which point the HDC becomes ground stabilized. If HDC is VALID, TMS-RIGHT creates a Mark Point at the HDC position.
㉒	**Own SPI**. Ownship SPI is indicated as a three-level, white wedding cake symbol.
㉓	**Helmet Elevation Lines.** Indicates the pitch angle of the HMCS line of sight.
㉔	**Aircraft Heading**. The current magnetic heading of the aircraft.
㉕	**Radar Altitude**. Altitude above surface.

085

MRK A

5

-05 -05
8

TARGET WP

2

INBOUND

2
4

221

5970 16

5

X

-10 -10

096/5
3676
F18

4420R

327/367

-15 -15

357

HMCS Profile Editing
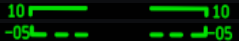
Adjustments to the display profile for the HMCS are made on the Status Page (STAT). The STAT MFCD page of the HMCS can be accessed via STAT ▶ HMCS.

The HMCS Page contains three preloaded profiles. Edit each profile by first selecting a profile (OSBs 3 through 5). This displays the selected profile on the HMD along with the profile name (i.e. PRO1) for 2 seconds. Using the Symbol Navigation buttons (OSBs 6 and 7, or 19 and 20) select the symbol to be edited. Once selected, the Symbol State button (OSB 18) toggles the symbol ON, OFF, or OCLD (symbol is ON and occludable) for that profile (Note: The HORIZON LINE is an exception and can be set to OFF, NORM, and GHST). Certain symbols can also have a defined maximum range for display. The range can be set on the scratchpad with a value of 1 - 999.
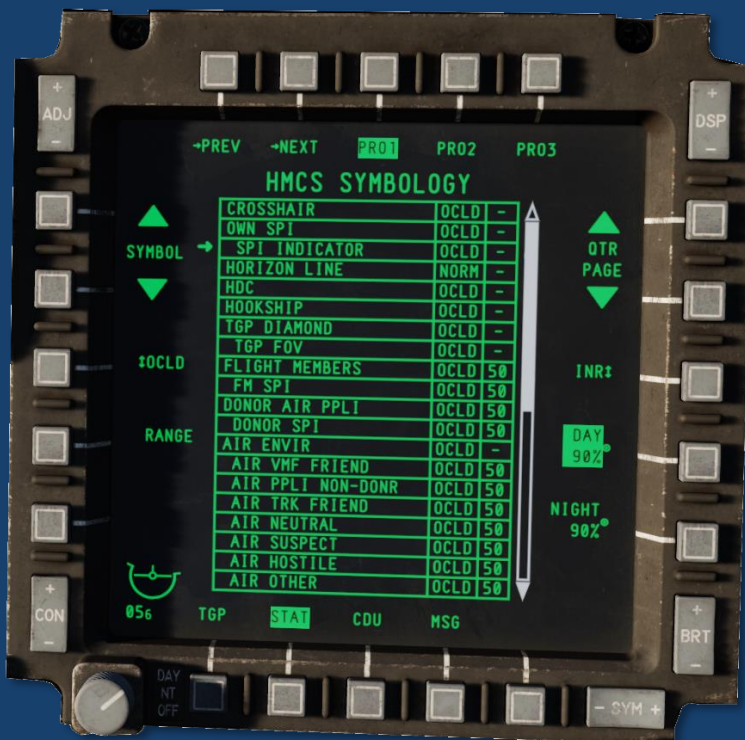
The next page shows which elements of the HMCS can be switched on and off.

CROSSHAIR	OCLD OFF ON	
OWN SPI	OCLD OFF ON	
SPI INDICATOR	OCLD OFF	
HORIZON LINE	NORM GHST OFF	
HDC	OCLD OFF ON	
HOOKSHIP	OCLD OFF ON	079/34 078/35 134S A10 0 009/231
TGP DIAMOND	OCLD OFF ON	
TGP FOV	OCLD OFF ON	
FLIGHT MEMBERS	OCLD OFF ON	2 1
FM SPI	OCLD OFF ON	31 1
DONOR AIR PPLI	OCLD OFF ON	
DONOR SPI	OCLD OFF ON	36
AIR ENVIR	OCLD OFF ON	
AIR VMF FRIEND	NO FUNCTION	
AIR PPLI NON-DONR	OCLD OFF ON	39
AIR TRK FRIEND	NO FUNCTION	
AIR NEUTRAL	NO FUNCTION	
AIR SUSPECT	NO FUNCTION	
AIR HOSTILE	NO FUNCTION	
AIR OTHER	NO FUNCTION	
GROUND ENVIR	OCLD OFF ON	
GRD VMF FRIEND	OCLD OFF ON	
GND PPLI	NO FUNCTION	
GND TRK FRIEND	NO FUNCTION	
GND NEUTRAL	NO FUNCTION	
GND SUSPECT	NO FUNCTION	
GND HOSTILE	NO FUNCTION	
GND OTHER	NO FUNCTION	
EMER POINT	NO FUNCTION	
STEERPOINT	OCLD OFF ON	
MSN/MARKPOINTS	OCLD OFF ON	
MSN/MARK LABELS	OCLD OFF ON	WAYPOINT MRK A
AIRSPEED	OCLD OFF ON	228
RADAR ALTITUDE	OCLD OFF ON	3920R
BARO ALTITUDE	OCLD OFF ON	
A/C HEADING	OCLD OFF ON	359
HELMET HEADING	OCLD OFF ON	355
HMD ELEV LINES	OCLD OFF ON	10 10 -05 -05

List of Abbreviations

E

EPLRS	Enhenced Position Location Reporting System

F

FOV	Field of View
HMD	Helmet Mounted Display
HMCS	Helmet Mounted Cueing System
HUD	Head Up Display

H

HDC	HMCS Helmet Designation Cursor
HMD	Helmet Mounted Display
HMCS	Helmet Mounted Cueing System
HUD	Head Up Display

L

LSS	Laser Spot Search

M

MFCD	Multifunction Color Display

N

NM	Nautical Miles

O

OSB	Option Select Button

P

PPLI	Precise Participant Location and Identification

S

SOI	Sensor of Interest
SPI	Sensorpoint of Interest

T

TGP	Targeting Pod

U

UFC	Up Front Controller

Legend

↑	Press switch upwards, short
⇧	Press switch upwards, long
↓	Press switch downwards, short
⇩	Press switch downwards, long
←	Press switch to the left, short
⇦	Press switch to the left, long
→	Press switch to the right, short
⇨	Press switch to the right, long
↖	Push switch forward, short
⬉	Push switch forward, long
↔	Set switch to center position
↘	Push switch backward, short
⬊	Push switch backward, long
↺	Move slew control

↓	Press button